

Potential Waterfowl Brood Pond Construction on the Thermalito Afterbay

1.0 Description of Potential Resource Action:

This Potential Resource Action involves construction of four additional brood ponds within the Thermalito Afterbay over the term of the new FERC license. This Resource Action is one of several waterfowl related Resource Actions currently under consideration to minimize the affects of project operations on waterfowl reproduction.

2.0 Nexus to Project:

Water level fluctuations on the Thermalito Afterbay related to hydropower generation can adversely affect brooding waterfowl under certain conditions. Physical topography of the Thermalito Afterbay is such that even relatively minor lowering of the water surface elevation can result in extensive areas of exposed open mudflats along the northern and eastern edges. These mudflats contain little or no cover. Further, as drawdown continues the distance from open water to cover increases. Under these exposed conditions waterfowl broods are subject to high predation rates.

Figure 1. Exposed mud flats at Thermalito Afterbay (water surface elevation (124.0))



3.0 Potential Environmental Benefits:

The Department of Water Resources (DWR), California Department of Fish and Game (DFG), California Waterfowl Association (CWA), and other stakeholders have worked cooperatively over the last 15 years to increase waterfowl production on the Afterbay. One cooperative program to address the reduced cover associated with Afterbay operations involved construction of waterfowl brood ponds. These ponds are constructed by creating a small earthen dam across an inlet of the Afterbay. These impoundments maintain a relatively stable water surface elevation which allows the establishment of emergent vegetation as well as submerged aquatic habitat. Further, these impoundments would create conditions where the open water and terrestrial cover habitats are immediately adjacent. These brood ponds can significantly reduced waterfowl brood mortality.

The waterfowl brood ponds are constructed to reduce brooding waterfowl losses and increase production. The brood ponds also receive disproportionately heavy use as waterfowl pair water prior to the nesting season. The existing brood ponds provide improved habitat conditions for a variety of terrestrial and aquatic species including special status species.

4.0 Potential Constraints

Construction of waterfowl brood ponds has the potential to affect cultural resources and recreational use. Prior brood pond borrow area excavations have encountered significant paleontological resources. DFG currently restricts recreational use in the vicinity of waterfowl brood ponds during the nesting and brooding period. However, some existing brood ponds receive heavy recreational use outside the nesting/brooding period including dog trials, swimming, hunting, fishing, and nature study.

Construction of the waterfowl brood ponds requires that Afterbay water levels be drawn down during the construction period. Timing of construction must be coordinated with DWR operations to minimize or avoid power generation or water supply impacts.

5.0 Existing Conditions in the Proposed Resource Action Implementation Area:

This Resource Action will substantially alter conditions in four inlets of the Thermalito Afterbay. Creation of the brood ponds will provide a more stable site for establishment of emergent vegetation, aquatic vegetation, and improved moisture regimes for adjacent upland habitats. These more stable water surface elevations will provide habitat for species dependant on submerged aquatic vegetation and emergent vegetation (Photos 1 and 2). However, species dependant upon exposed flats (primarily shorebirds) would experience reduced habitat suitability in the four Afterbay inlets proposed for treatment during the period of brood pond inundation.

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Photo 1. Brood pond submerged aquatic habitat



Photo 2. Brood pond emergent cover



During September 1991, the DWR, DFG, CWA and other stakeholders evaluated approximately 22 potential brood pond locations within the Thermalito Afterbay. Evaluation criteria included:

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- Site not near high human use areas
- Dam crest elevation of 133.0 feet
- Minimal earthwork quantities
- Availability of construction materials and access to the site
- Normal Afterbay surface elevation of 130 to 131 feet
- Potential of expected use for nesting waterfowl

Twelve potential brood pond locations including C1, C3, E1, F2, F3, I1, J1, J2, K1, L1, L2, and L3 were eliminated from further evaluation based on the evaluation criteria. Proximity to high public use areas was the most frequently used exclusion criteria. Five waterfowl brood ponds were subsequently created (Figure 1) as a cooperative effort including 1A, A2, 4, B1, and C2. Four additional brood ponds were identified as meeting all the selection criteria including G-1, H-1, D-1, and F-4 or F-1 (Figure 2).

6.0 Design Considerations and Evaluations:

- Site not near high human use areas
- Dam crest elevation of 133.0 feet
- As low as possible earthwork quantities
- Availability of construction materials and access to the site
- Normal Afterbay surface elevation of 130 to 131 feet
- Potential of expected use for nesting waterfowl
- Incorporation of a head-gate release structure
- Avoidance of sensitive habitats

6.1 Environmental Permitting

These brood ponds can require a number of State or federal permits prior to construction including:

- U.S. Army Corp. of Engineers Clean Water Act 404 Permit
- Regional Water Quality Control Board Clean Water Act 401 Water Quality Certification
- DFG 1601 Streambed/Lakebed Alteration Agreement

6.2 Threatened and Endangered Species

A few of the special status species which have been observed on or near these brood ponds include bald eagle, osprey, black tern, American bittern, American white pelican, white-faced ibis, black-crowned night heron, double-crested cormorant, long-billed curlew, and short-eared owl. Further, these ponds also provide potentially suitable habitat for species protected under the State and/or federal Endangered Species Acts including bald eagle, giant garter snake and red-legged frog.

Construction access and borrow area selection will be designed to avoid impacts on vernal pool habitats and rare plant populations.

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6.3 Previous Results

Qualitative observations of the existing waterfowl brood ponds indicate that the brood ponds receive disproportionately high waterfowl use throughout the year compared to unmanipulated areas of the Afterbay. Further, preliminary data indicate that waterfowl brood ponds can reduce waterfowl brood losses and increase production (Anthrop pers. comm.).

6.4 Additional Operations and Maintenance

No post-construction operational changes will be required. Brood ponds can be recharged either through Afterbay water levels or pumpage. Design criteria for future brood ponds would allow newly constructed brood ponds to be recharge from the same Afterbay level fluctuations and time periods as the currently existing brood ponds.

Properly designed and engineered brood ponds require relatively little long-term maintenance. DFG has drained a brood pond on at least one occasion to eliminate non-native fish species. Drainage can require a substantial manpower for fish rescue efforts.

6.5 Evaluation and Monitoring

The principal evaluation criteria for evaluation of the success of the potential brood ponds will be water level stability during the waterfowl brooding season. Other than annual inspection related to structural integrity, no additional monitoring is recommended.

6.6 Closely Related Resource Actions

This Resource Action is closely associated with two potential Resource Actions (EWG-68A – Recharge of Waterfowl Brood Ponds and EWG-57A - Waterfowl Nesting Cover Enhancements). All three potential Resource Actions work together to minimize the potential adverse impacts associated with Afterbay water level fluctuations on waterfowl survival and production.

EWG-57A provides nesting habitat for waterfowl displaced by Afterbay water level fluctuations while EWG-68A identifies a schedule for brood pond recharge to maintain the functionality of both existing and any future ponds.

7.0 Synergism and Conflicts:

The goal of this Resource Action is to (in coordination with EWG-68A and 57A) improve waterfowl nesting, production, and survival. Although incremental benefits can be provided through implementation of any of the three potential Resource Actions, they will be most affective if implemented as a package. Additional brood pond construction is most effective if the ponds can be filled and maintained at levels where suitable cover is adjacent to brood water during the waterfowl brooding period. Providing adequate brooding habitat within $\frac{3}{4}$ miles of high quality nesting habitat minimizes waterfowl losses during critical waterfowl life stages.

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8.0 Uncertainties:

Over the last 15 years the brood pond concept has proven to be an effective management tool at the Thermalito Afterbay, providing a relatively stable source of cover for young ducklings in comparison to the Afterbay.

9.0 Cost Estimates:

A 1993 DWR internal memo provides rough cost (+ or – 10 %) estimates for several of the currently constructed brood ponds. These cost ranged between \$60,000 and 90,000 per brood pond. These are construction costs which do not appear to include charges related to engineering or environmental permitting. Current construction cost will likely be higher than these 1993 estimates. A rough estimate of current costs (including engineering and permitting) would likely be 30 to 50 percent greater or \$78,000 to \$134,000 per brood pond.

10.0 Recommendations:

Brood ponds are an effective, documented method to reduce the affects of water level fluctuations at the Thermalito Afterbay on waterfowl survival and production. Further, the brood ponds provide habitat diversity within the Thermalito portion of the OWA resulting in increased wildlife species diversity benefiting a wide range of wildlife species including several special status species.

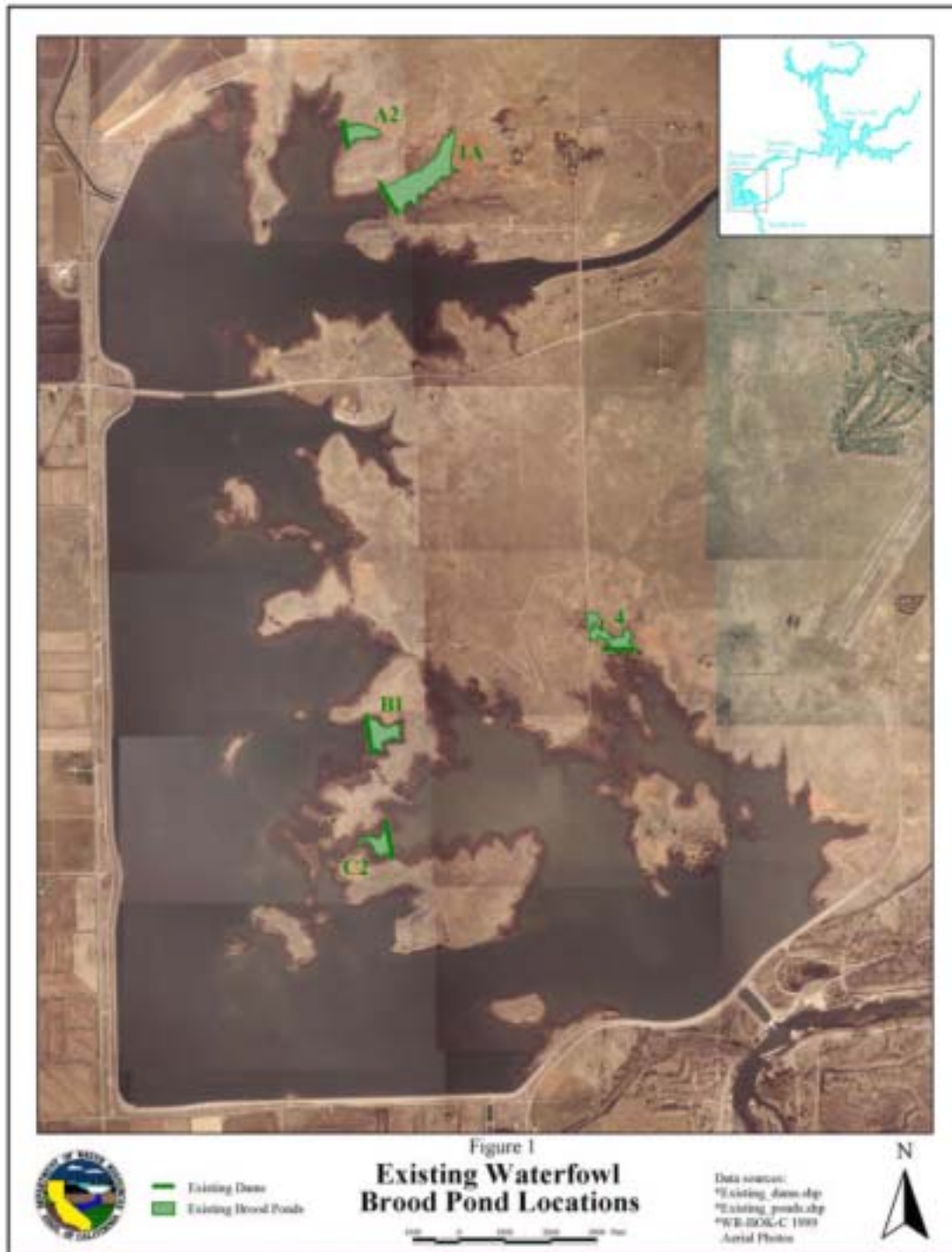
11.0 Literature Cited

Dr. Don Anthrop personal communication April 2003

DWR Memo from Linton Brown (Northern District) to Forest Neff (Operations and Maintenance (Headquarters) February 19, 1993

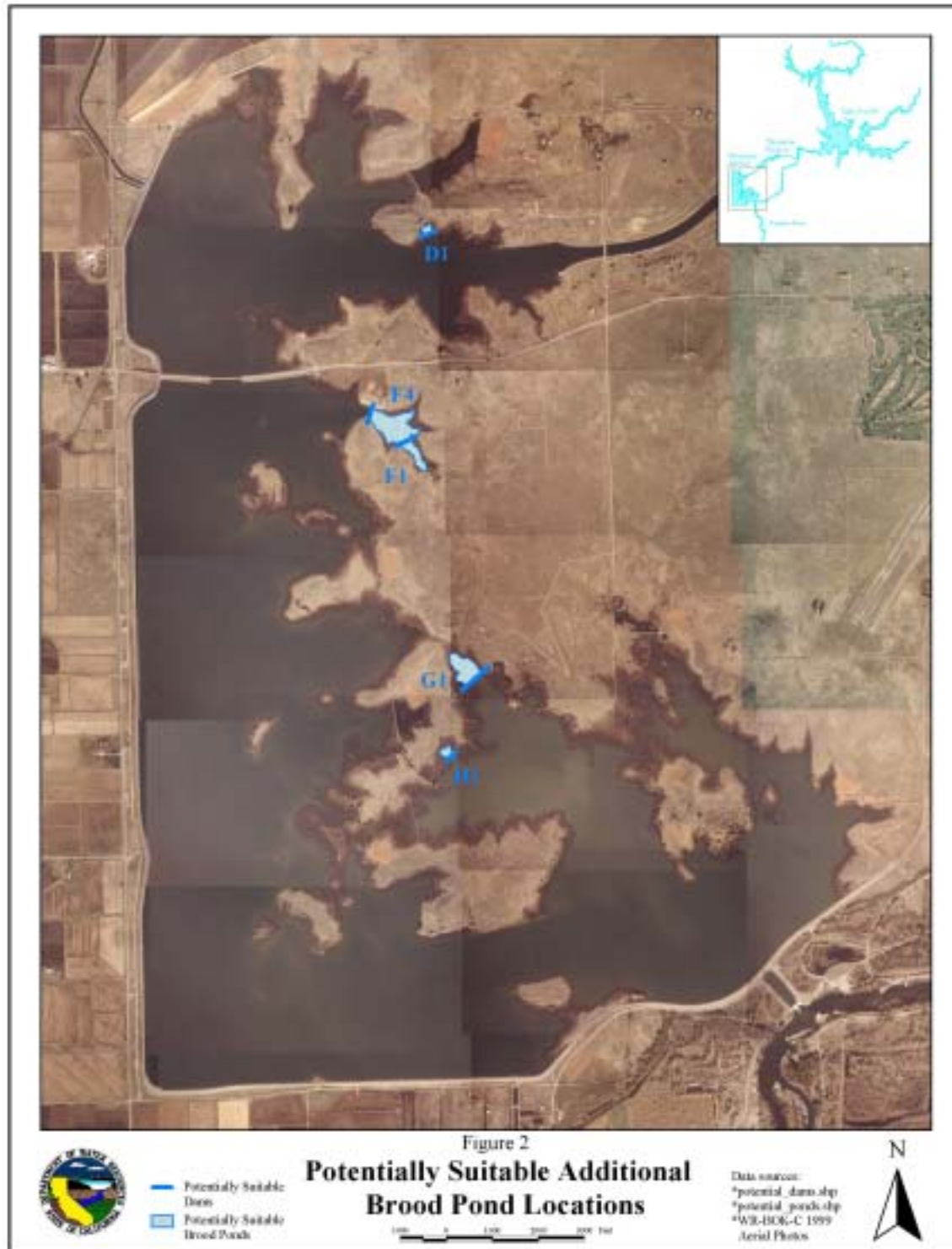
DWR Memo from Ed Barnes (Northern District) to Thermalito Afterbay Duck Pond Committee, October 7, 1991

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